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THE CONTROL OF BULK MILK IN STORES.

BY

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INTRODUCTION.

It has been a too prevalent custom in the past to lay all of the blame for dirty milk upon the shoulders of the milk producer. While this may be an easy and convenient way to shift the burden of responsibility from city to country, still it is apt not only to hurt the dairy industry unfairly, but to close the eyes of reformers and health authorities to questions that lie nearer home. It is easy to cry out against the dairy farmer who lives at a distance, at the same time ignoring near-by methods which may serve to make the milk more dangerous than does the contamination received at the farm. Dairy inspection, to be complete and effective, must not only safeguard the points of production, but must closely follow the product in its subsequent journey until finally it is consumed.

The Department of Agriculture has realized the importance of this question and has published a score card for city milk plants, endeavoring to inaugurate a careful inspection of them by local authorities. It has been found, however, that many cities stop in their inspection work when the milk has passed through the city plant and been prepared for delivery. In comparatively few localities is there a systematic efficient method for the control of milk-selling stores. These stores are usually groceries, entirely unfitted for handling milk. They possess, in general, no proper receptacle for icing and storing milk; they are not equipped with efficient means of cleaning and sterilizing the utensils used in measuring; they are usually located in congested districts, among the poorer class of consumers, and are often conducted by ignorant and careless proprietors. As a city grows in size and the congestion is greater, this problem assumes greater proportions, not only because the number of milk-selling stores is larger, but because increased congestion means lessened vitality in the children and a consequent need of purer milk.

To ascertain the extent of store trade in milk, the following set of questions was sent out to 47 of the largest cities in this country:

1. About how many stores (groceries, etc.) sell milk in your city?
2. What proportion sell bottled milk?
3. About how many gallons of dipped milk are sold daily from such stores?

4. What regulations have you governing stores that sell milk?
5. Do you have much difficulty with such stores?
6. How often are such stores inspected?
7. Have you any figures showing bacterial counts of dipped store milk as compared with wagon milk or bottled milk?
8. Do you consider dipped store milk to be a serious problem in your city?

EXTENT OF STORE-MILK TRADE.

During recent years the proportion of bottled milk consumed has greatly increased, and it is rather surprising to note the amount of bulk milk still used. The cities reporting had an average population of 451,239, or about the same as Detroit, Mich. These cities averaged 1,256 milk-selling stores, or one for every 359 inhabitants. Of these stores, 52.4 per cent sold only bottled milk, while the remainder, 47.6 per cent, dealt in bulk milk. The amount of bulk milk sold over the counter amounted to 231,896 gallons a day in 17 cities reporting. This is 13,641 gallons a day in each city allowing the practice, and 0.165 pint a day for every inhabitant—men, women, and children. This means that a cylinder 6 feet in diameter and 64½ feet high could be filled daily in each of these average cities with milk which is dipped, poured, or handled over in the poorly equipped, often filthy, corner grocery store. These figures are enough to convince one as to the magnitude of this question. Add to the amount of bulk milk the conditions under which most of it is handled, and the fact that much of it is fed to children already weakened in vitality by overcrowding, underfeeding, and lack of intelligent care, and the problem assumes a serious aspect.

PRESENT MUNICIPAL CONTROL.

As evidenced by the replies to the questions sent out, methods for the control of store milk vary greatly in different cities. Some localities apparently pay no attention whatever to the problem, others require that the milk sold must "come up to standard," while a very few seem to carry on a fairly regular, efficient, sanitary inspection. Only four cities reported a score card in use for stores. Sixteen and two-thirds per cent of all the cities answering had no inspection at all, or at best a sporadic, irregular inspection. The cities reporting regular systems averaged 13 inspections a year, or about 1 a month. Bottled milk only is permitted to be sold in some cities, and this has had the effect of greatly improving conditions. As has already been mentioned, over half of the milk-selling stores now handle exclusively the bottled product.

An analysis of the laws for the control of stores shows in many cases that the subject has been sadly neglected. Some lawmakers have apparently believed that the issuance of a "permit" or "license" by the board of health, for the trifling consideration of a

dollar or so, would serve as an effective talisman against all the dangers of impure milk. What matter if no inspector ever crosses the threshold of the "licensed" milk store, so long as the fee is collected. More progressive cities demand that store milk be kept under certain sanitary conditions, and that it must conform to definite chemical and bacteriological standards. It is encouraging now and then to find clear, concise regulations such as these: "Clean all measures and scald them daily with boiling water." "The ice box or ice tub in which milk * * * is kept must be thoroughly cleaned by scrubbing at least twice a week."

Here, then, are two classes of cities in which there is no adequate control of store milk. One class comprises those cities which have no ordinance requiring an inspection of stores; the other class, cities having laws covering the subject, but where, either through inefficiency or ignorance, such laws are not enforced. There is still another class where the laws exist and the good intentions exist, but where no financial means have been provided for the execution of the regulations. The sad plight of such a town is aptly described by the board of health of a city of 100,000, who write: "Have the regulations in the code, but no appropriation to carry them out. Have tried for several years to have all milk and sources of supply regularly inspected, but have not succeeded as yet."

DISADVANTAGES OF BULK STORE MILK.

To one who has made even a cursory examination of the subject the disadvantages of the practice of dipping milk are obvious. They are chiefly of two classes, chemical and bacteriological. The chemical composition is important, but should be considered as secondary to the cleanliness and healthfulness of the product. The skimming or watering of milk is usually a deliberate fraud, and as a result the consumer gets a lesser value for the money expended. On the other hand, bacterial contamination often takes place through ignorance, and its results are far more dangerous to health.

No matter how bulk milk is handled, there is always the likelihood (aside from premeditated adulteration) that some customers will be served at the expense of others. If the milk is ladled out of a can, the top layer containing much of the cream is liable to be used first, leaving the skim milk for later buyers. If a storage tank with a faucet is used, the process is reversed and the skim milk is drawn first. Whether or not the fraud is intentional, the wrong is done, and the customer has no way of seeing the amount of cream on the milk, as he may do if the fluid is in a glass bottle. The health department of one large city writes that a chemical analysis of store milk shows from 5 to 10 per cent of it to be watered. They do not say how much more was skimmed. The chief milk inspector of

Detroit says: "In addition to the sanitary defects of bulk milk in stores, we found that 20 per cent of the samples taken therefrom were adulterated."

Turning now to the dangers from bacterial contamination, we are confronted by the most serious aspect of the problem. Every pair of hands through which milk must pass adds to the danger of its contamination. The hands of the corner groceryman are not always clean, nor do they always find within reach proper facilities for handling milk. Another condition adverse to store milk is the fact that those who handle it, as a rule, do not understand or care about the principles underlying its proper handling. We expect and require that dairymen and managers of milk plants should have some knowledge regarding the product with which they deal, but we allow gross ignorance and carelessness to creep in farther along the line. The small grocer keeps milk usually as an accommodation to his customers and not for any revenue it may bring in. Since this is so, he dislikes any extra trouble connected with the distribution of such a perishable article of trade.

BACTERIAL CONTAMINATION IN STORES.

It is a well-established fact that bulk store milk generally contains many more bacteria than does milk delivered from house to house by the dairyman. Many of the largest cities in the country either do not seem to realize the importance of this phase of the milk question, or else they are content to accept the statement without attempting to test its truth in their own cases.

Of the 43 cities from which replies were received to the question "Have you any figures showing bacterial counts of dipped store milk as compared with wagon milk or bottled milk?" 35, or over 81 per cent, answered "No." Five cities made the general statement that dipped store milk ran much higher in bacteria than wagon milk, but gave no results of experiments which would support the statement conclusively. One city officer says: "We have decided that the bacteriological examination of milk taken from cans in the stores is useless, because milk taken from vessel of customers has always shown a much higher count." Another, in a city of over 300,000 population, writes: "We make no bacterial counts." Three cities—Boston, Mass., Newark, N. J., and St. Paul, Minn.—gave bacterial counts which are well worth summarizing.

Boston figures for 1908–9 show:

	Per cent.
Samples of wagon milk containing over 500,000 bacteria per cubic centimeter.	27. 85
Samples of store milk containing over 500,000 bacteria per cubic centimeter..	56. 59

For 1909–10:

Samples of wagon milk containing over 500,000 bacteria per cubic centimeter.	24. 61
Samples of store milk containing over 500,000 bacteria per cubic centimeter.	45. 26

These results were obtained from a large number of analyses and should be considered a fair average.

St. Paul, Minn., gives the results of a good number of bacteriological examinations, and these summarized give the following figures:

Wagon milk, average count 409,477 bacteria per cubic centimeter.
Dipped store milk, average count 8,206,000 bacteria per cubic centimeter.

This shows an increase of about 1,904 per cent in bacteria from the milkman's wagon to the consumer's table by way of the dipped-milk shop.

Newark, N. J., contributes some figures which confirm the foregoing figures. An average of the results reported by this city shows:

Bottled wagon milk, 416,000 bacteria per cubic centimeter.
Dipped wagon milk, 3,623,333 bacteria per cubic centimeter.
Milk delivered to store, 28,800 bacteria per cubic centimeter.
Same milk, 8 hours later, 1,488,000 bacteria per cubic centimeter.

The question naturally arises as to the reasons for this much higher bacterial count in the bulk store milk. There are two main reasons—contamination and lack of proper refrigeration during storage. To these reasons might be added another—that often milk of the poorest grade is set aside by unscrupulous dealers for delivery to stores. This milk may be delivered sweet to the store, and if it later sours on the consumer's hands the fault will be laid to the storekeeper instead of the dealer. Such milk could not be bottled and put out on the retail wagons without causing a considerable loss of trade through dissatisfied customers.

The very nature of the surroundings in the average store makes for the easy contamination of bulk milk. We insist that milk handling stations shall be kept free from rubbish, and even go so far as to advise that in constructing such buildings all unnecessary ledges and dust catching projections be avoided. In the grocery store, however, far different conditions are sometimes found: shelves filled with goods which form myriad nooks and corners for the collection of dust; tubs of rubbish and refuse; kerosene, onions, cabbage, and other odoriferous articles; mice, roaches, and sometimes other vermin at large; people passing in and out, stirring up the dust and tracking street filth into the store; flies, numerous and busy, passing and repassing between the milk cans or dippers and nearby spittoons and garbage barrels. And in the midst of all this, a can of milk—sometimes covered, sometimes not—ladled and poured, dipped and stirred, and finally carried away for baby's breakfast.

In most of the smaller and poorer stores part of the building is used for the owner's residence. Sometimes the living room opens directly into the salesroom, and the danger from infection is serious when there is illness in the family. If there are children, they run

in and out between the house and the store. The chief milk inspector in a city of some size is authority for the statement that he has seen a child playing in a store pick up a handful of dirt from the floor, toddle to an open can, and empty the filth into the milk.

Another serious factor in the sale of bulk milk in stores is the lack of care in cleaning the utensils. Dippers and measures sometimes go for days at a time unwashed, and the old milk left in the seams and crevices provides an ideal breeding place for bacteria. Even though the utensils may be apparently clean, they may not be bacteriologically clean. Ultimate cleanliness can not be secured except by boiling or steaming, and this is seldom done in the average store.

The direct contact with dirty attendants is often another cause of contamination. Dirty hands are smeared on the dipper or the storage can, and in measuring out a customer's purchase the pitcher or other receptacle is carefully held over the open can, so that if any milk runs down over the salesman's hands it will not be wasted.

After contamination has occurred, bacterial growth is greatly accelerated by improper refrigeration. The multiplication of organisms in warm milk takes place at a rapid rate, and milk which was originally of fair quality may soon become unfit for use if not stored at a low temperature. Under store conditions refrigeration is often most unsatisfactory and inefficient. Sometimes the can of milk is left by the dealer outside the door, where it stands in the dust and heat until the store is opened in the morning. Even after the can is taken into the store, it often stands around for some time before being placed on ice. Perhaps the iceman is late, or his supply is exhausted before the store is reached. Then, too, ice is an expensive luxury in some of the tenement districts, and the tendency is to make a small quantity do an impossible amount of work, with the result that the milk is left without proper refrigeration before the day is over.

SUGGESTED MEANS OF CONTROL.

That dipped store milk is a problem in many large cities is shown by the answers to the questions to which reference has already been made. Twenty-one cities where dipped milk is sold reported, and of this number 7, or 33⅓ per cent, reported much trouble with milk stores. As the amount of dipped milk sold increases, the gravity of the situation also increases. This is confirmed by a close inspection of the answers to the question, "Do you consider dipped store milk to be a serious problem in your city?" The cities answering "No" averaged only 37.37 per cent of dipped milk, while those answering "Yes" averaged 63.81 per cent.

It is a far easier matter to point out defects than it is to suggest efficacious remedies. It is also easy to formulate drastic procedures

for a cure, but we must be careful that the surgeon's knife, in excising a diseased area, does not cut too deep and inflict a mortal wound. While it is possible in some localities to allow only bottled milk to be sold, still there are other cities where it is impracticable to abolish the system at once. It must be admitted that bottling adds to the cost of the finished product, and as the dealer will not pay the increase, it reacts on the consumer. If the consumer is able to pay this increase, well and good; but if not, the logical result will be that the use of this valuable food product will be seriously curtailed. Another reason for the tolerance of bulk milk under certain conditions is this: Many poor families in the overcrowded tenement districts buy only one or two cents' worth of milk at a time. Even if it were possible for this class of people to buy a whole bottle at a time, there would be no means of keeping it cold in most of the homes. So, then, we must be able to enforce a system which will allow the poor consumer to buy a reasonably priced milk in quantities small enough for immediate use; and, moreover, this milk must not only be carefully produced, but it must be carefully handled in the city.

Since bulk milk will be allowed for the present, at least, in some cities, it is well to consider how it may best be controlled. First of all, a regular system of inspection for stores should be established. Inspections should take place at least once a month, and where very bad conditions exist weekly visits should be made until a better state of affairs is found. To keep accurate account of all milk-selling stores, it is best to require a permit; this permit should be issued free of cost if possible, but at any rate the financial value of the permit should be made subordinate to its worth as a record and a guide to inspection.

THE SCORE-CARD SYSTEM OF INSPECTION.

Experience in sanitary inspection has taught that there is no system so efficient as the use of the score card. This method of inspection takes cognizance of every condition, and the finished score gives an accurate record of the minutest details. The record thus formed is a much more reliable estimate of conditions than is a mere survey unaided by the score card; also, the completed score serves as a permanent record to be filed in the office, to be used as a future reference and guide. The work of securing improved sanitary conditions is largely a work of education; the score card forms an ideal textbook, containing as it does an observation of each condition, rated mathematically according to its importance.

In the work of the Dairy Division score cards have been used for some time in rating sanitary conditions connected with the production, handling, and distribution of milk. Realizing the need of still

further inspection, a score card has been worked out for stores where bulk milk is handled. This card, which is reproduced on next page, follows the general form which has been found successful in other score cards. Items of equipment and methods have been separated, and the greatest credit is allowed for methods; thus a premium is put upon care and vigilance rather than upon expensive construction and appliances.

It is important, in formulating a score card, to avoid items which are indefinite and those which allow great latitude of judgment by an inspector. The main points on the card should be so divided into subheads that the verdict of different inspectors can not vary greatly. On the score card used by one city appears the item: "Cleanliness of store and its surroundings, 20." Here are one-fifth of the total points in the score given under one head, without any specification of the different details contributing to the general cleanliness. The judgment of two different inspectors might easily vary 10 points under so general and indefinite a classification.

The score card should be regularly used in inspection work among stores, and it is believed that it will do much to improve conditions.

The Dairy Division score card for stores handling bulk milk is as follows:

[Front of card.]

[United States Department of Agriculture, Bureau of Animal Industry, Dairy Division.]

SANITARY INSPECTION OF STORES HANDLING BULK MILK.

Operator: ———. Address: ———. Gallons sold daily: ———. Permit No.———. Date: ———. Remarks: ———.

(Signed) ——— ———, *Inspector.*

[Back of card.]

DETAILED SCORE.

Equipment.	Score. Perfect.	Score. Allowed.	Methods.	Score. Perfect.	Score. Allowed.
Building:			Building:		
Location: Free from contaminating surroundings	2	.....	Cleanliness	10	.....
Separate room for milk handling	5	.....	Floor	3	
Construction	8	.....	Wall	2	
Floors, tight, smooth, cleanable	1		Ceiling	2	
Walls tight, smooth, cleanable	1		Show cases, shelves, etc	3	
Ceilings, tight, smooth, cleanable	1		Freedom from flies	3	.....
Show cases smooth, free from ledges and crevices	1		Freedom from rubbish	2	.....
Provision for light (10 per cent of floor space)	1		Air	4	.....
Provision for pure air	1		Freedom from dust	2	
Screens	2		Freedom from odors	2	
Utensils	15	.....	Utensils	20	.....
Construction: Easily cleaned; free from open seams and complicated parts	5		Thoroughly washed and rinsed	10	
Condition: Free from rust, dents, etc.	2		Steamed	10	
Facilities for cleaning:			(Scalded, 5.)		
Water clean, convenient, and abundant	2		Ice box:		
Hot water or steam	3		Cleanliness of ice box	3	.....
Brushes and washing powder	1		Handling:		
Protected from flies and dust when not in use	2		Placed on ice as soon as received	5	.....
Ice box	10	.....	(Protected, put on ice inside of an hour, 2.)		
Separate ice box for milk	5		(Unprotected, but put on ice inside of an hour, 1.)		
(Milk kept in separate compartment, 2.)			Temperature of milk, below 50° F. (51–55, 8; 56–60, 5; 61–65, 2)	10	.....
Construction	3		Freedom from undue exposure to air	2	.....
Tight and cleanable	1		Cleanliness of attendants	1	.....
Nonabsorbent lining	1				
Good drainage	1				
Protected from flies and dust	2				
Total	40	.....	Total	60	.....

Equipment ..... + Methods ..... = Total.....

NOTE.—If the conditions in any particular are so exceptionally bad as to be inadequately expressed by a score of "0," the inspector can make a deduction from the total score.

ULTIMATE RESULTS OF INSPECTION.

A scoring of all the stores handling milk will result in a list definitely classified as to conditions found. Then a minimum score standard can be set which will cause some of the worst stores to improve or else stop handling milk. This minimum standard can be gradually raised as conditions improve, always leaving a few stores below the required mark. The result will be that quite a number of storekeepers will stop the sale of milk rather than make the effort to improve. No regret need be felt over this, as it will mean the elimination of the most careless and ignorant class.

Probably the ideal system for store milk (if bottled milk is not practicable) is to have a few central distributing stations. In these stations only milk would be dispensed, and a high standard of cleanliness could be maintained; they could be operated, under municipal control, by milk dealers or by a corporation as a business proposition. Such stations could afford superior equipment and a better class of labor than could be secured by storekeepers who handle only a few quarts a day. Already in some cities this plan is being used, but usually the effort is sustained by contributions and is able to reach only a small proportion of the babies. What is needed is a system which will be self-supporting and permanent and which will safeguard every drop of milk sold over the counter.

Perhaps this system of central milk-distributing stores is idealistic, but it is believed that the careful and persistent use of the score card in inspection will tend toward this result by eliminating many of the careless dealers. Gradually it will come about that milk will be handled by fewer stores, stores that can afford better equipment and where the supervision is more intelligent.

This change will take place without the danger of friction that would follow a more drastic ordinance. Reforms must stand the test of practicability before they can be of any use. The milk problem is an enormous one, which can not be solved at once, and we should strive always for a gradual, healthy growth.

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